

We claim

1. An isolated DNA molecule selected from the following *per5* promoter sequences

bp 4086-4148 of SEQ ID NO 1,

bp 4086 to 4200 of SEQ ID NO 1,

bp 4086 to 4215 of SEQ ID NO 1,

bp 3187-4148 of SEQ ID NO 1,

bp 3187-4200 of SEQ ID NO 1,

bp 3187-4215 of SEQ ID NO 1,

bp 2532-4148 of SEQ ID NO 1,

bp 2532-4200 of SEQ ID NO 1,

bp 2532-4215 of SEQ ID NO 1,

bp 1-4148 of SEQ ID NO 1,

bp 1-4200 of SEQ ID NO 1, and

bp 1-4215 of SEQ ID NO 1,

or a fragment, genetic variant or deletion of such a sequence which retains the ability of functioning as a promoter in plant cells.

2. An isolated DNA molecule selected from the following *per5* intron sequences

bp 4426-5058 of SEQ ID NO 1,

bp 4420-5064 of SEQ ID NO 1,

bp 5251-5382 of SEQ ID NO 1,

bp 5245-5388 of SEQ ID NO 1,

bp 5549-5649 of SEQ ID NO 1, and

bp 5542-5654 of SEQ ID NO 1.

3. An isolated DNA molecule corresponding to the *per5* transcription termination sequence and having the sequence of bp 6068-6431 of SEQ ID NO 1.

4. An isolated DNA molecule having a 20 base pair nucleotide portion identical in sequence to a consecutive 20 base pair portion of the sequence set forth in SEQ ID NO 1.

5. A recombinant gene cassette competent for effecting preferential expression of a gene of interest in a selected tissue of transformed maize, said gene cassette comprising:

- a) a promoter operable in maize;
- b) an untranslated leader sequence;
- c) the gene of interest;
- d) a 3'UTR;

said promoter, untranslated leader sequence, gene of interest, and 3'UTR being operably linked from 5' to 3'; and

e) an intron sequence that is incorporated in said untranslated leader sequence, in said gene of interest, or in said 3'UTR, said intron sequence being from an intron of a maize gene that is preferentially expressed in said selected tissue, and said intron sequence being from a gene other than the gene of interest.

6. A recombinant gene cassette of claim 5 wherein the promoter is from a first maize gene, said first maize gene being one that is naturally expressed preferentially in the selected tissue.

7. A recombinant gene cassette of claim 5 wherein said intron sequence is incorporated in said untranslated leader.

8. A recombinant gene cassette of claim 5 wherein said selected tissue is root tissue.

9. A recombinant gene cassette of claim 8 wherein said intron sequence is comprised of bp 4420 to bp 5064 of SEQ ID NO 1.

10. A recombinant gene cassette of claim 5 wherein said promoter is a *per5* promoter comprised of bp 2532-4148 of SEQ ID NO 1.

11. A recombinant gene cassette of claim 10 wherein said promoter is a *per5* promoter comprised of bp 1-4148 of SEQ ID NO 1.

12. A recombinant gene cassette of claim 5 wherein the 3'UTR is a *per5* 3'UTR comprised of bp 6068 to bp 6431 of SEQ ID NO 1.

13. A recombinant gene cassette competent for effecting constitutive expression of a gene of interest in transformed maize comprising:

- a) a promoter from a first maize gene, said first maize gene being one that is naturally expressed preferentially in a specific tissue;
- b) an untranslated leader sequence;
- c) the gene of interest, said gene being one other than said first maize gene;
- d) a 3'UTR;

said promoter, untranslated sequence, gene of interest, and 3'UTR being operably linked from 5' to 3'; and

- e) an intron sequence that is incorporated in said untranslated leader or in said gene of interest, said intron sequence being from an intron of a maize gene that is naturally expressed constitutively.

14. A recombinant gene cassette of claim 13 wherein said intron is the *Adh1* intron 1 or an operative portion thereof.

15. A recombinant gene cassette of claim 14 wherein said promoter is a *per5* promoter comprised of bp 2532 to 4148 of SEQ ID NO 1, or an operative portion thereof.

16. In a recombinant gene cassette for effecting expression of a gene of interest in a transformed plant cell wherein said gene cassette is comprised of:

- a promoter;
- an untranslated leader sequence;
- the gene of interest, said gene of interest being a gene other than *per5*; and
- a 3'UTR;

the improvement wherein said 3'UTR is a *per5* 3'UTR comprised of bp 6068 to 6431 of SEQ ID NO 1.

17. A recombinant gene cassette of claim 16 wherein said promoter is selected from the group consisting of the 35T promoter, the ubiquitin promoter, and the *per5* promoter comprising bp 2532 to 4148 of SEQ ID NO 1.

18. A DNA construct comprising, operatively linked in the 5' to 3' direction,

- a) a promoter comprising bp 4086-4148 bp of SEQ ID NO 1;
- b) an untranslated leader sequence,
- c) a gene of interest not naturally associated with said promoter;
- d) a 3'UTR.

19. A DNA construct of claim 18 wherein the promoter and untranslated leader sequence together comprise bp 4086-4200 of SEQ ID NO 1.

20. A DNA construct of claim 18 wherein the promoter is comprised of bp 3187-4148 of SEQ ID NO 1.

21. A DNA construct of claim 18 wherein the promoter is comprised of bp 2532-4148 of SEQ ID NO 1.

22. A DNA construct of claim 18 wherein the promoter is comprised of bp 1-4148 of SEQ ID NO 1.

23. A DNA construct of claim 18 wherein said 3'UTR is the *nos* 3'UTR.

24. A DNA construct of claim 18 wherein said 3'UTR has the sequence of bp 6066-6550 of SEQ ID NO 1.

25. A DNA construct comprising, operatively linked in the 5' to 3' direction,

- a) a promoter comprised of bp 4086-4148 bp of SEQ ID NO 1;
- b) an intron selected from the group consisting of *Adhl* intron 1 and bp 4426-5058 of SEQ ID NO 1;
- c) a gene of interest not normally associated with said promoter;

- d) a 3'UTR.

26. A DNA construct of claim 25 wherein said 3'UTR is selected from the group consisting of *nos* and bp 6067-6340 of SEQ ID NO 1.

27. A DNA construct of claim 25 wherein said 3'UTR is selected from the group consisting of *nos* and bp 6067-6439 of SEQ ID NO 1.

28. A DNA construct comprising, in the 5' to 3' direction,

- a) a promoter having as at least part of its sequence bp 4086-4148 bp of SEQ ID NO 1;

- b) an intron selected from the group consisting of *Adh1* intron 1 and bp 4426-5058 of SEQ ID NO 1;

- c) a cloning site;

- d) a 3'UTR.

29. A DNA construct of claim 28 wherein said 3'UTR is selected from the group consisting of *nos* and bp 6067-6340 of SEQ ID NO 1.

30. A plasmid including a promoter that is comprised of bp 4086-4148 of SEQ ID NO 1.

31. A plasmid of claim 30 wherein the promoter is comprised of bp 3187-4148 of SEQ ID NO 1.

32. A plasmid of claim 30 wherein the promoter is comprised of bp 2532-4148 of SEQ ID NO 1.

33. A plasmid of claim 30 wherein the promoter is comprised of bp 1-4148 of SEQ ID NO 1.

34. A plasmid comprising a recombinant gene cassette of claim 5.

35. A plasmid comprising a DNA construct of claim 18.

36. A transformed plant comprising at least one plant cell that contains a recombinant gene cassette according to claim 5.

37. A transformed plant comprising at least one plant cell that contains a DNA construct according to claim 18.
38. Seed or grain that contains a recombinant gene cassette of claim 5.
39. Seed or grain that contains a DNA construct of claim 18.
40. A method for expressing a gene of interest preferentially in a selected tissue which comprises transforming maize with a gene cassette of claim 5.
41. A method for expressing a gene of interest in maize preferentially in root tissue which comprises transforming maize with a gene cassette of claim 5 wherein the selected tissue is root tissue.
42. A method of claim 41 wherein the intron sequence in the gene cassette is comprised of bp 4420 to 5064 of SEQ ID NO 1.
43. A method of claim 40 wherein the promoter in the gene cassette is a *per 5* promoter comprised of bp 2532 to 4148 of SEQ ID NO 1, or an operative portion thereof.